

WHAT IS CLAIMED IS:

- 1 1. A composite liner panel for use in a thermal insulated wall structure, comprising:
 - 2 a. at least one gas impermeable barrier layer;
 - 3 b. at least one structural polymer resin layer disposed coplanar and attached
4 to said barrier layer, thereby forming a laminate liner panel; and
 - 5 c. an insulated core layer disposed coplanar to said at least one gas
6 impermeable barrier layer.
- 1 2. The composite liner panel of claim 1, wherein said structural polymer resin layer is
2 fiber reinforced.
- 1 3. The composite liner panel of claim 1, wherein said structural polymer resin layer is
2 strengthened by orienting the polymer molecules.
- 1 4. The composite liner panel of claim 1, wherein said polymer resin is a thermoplastic
2 polymer.
- 1 5. The composite liner panel of claim 4, wherein said thermoplastic polymer is
2 polypropylene.
- 1 6. The composite liner panel of claim 5, wherein said at least one gas impermeable barrier
2 layer is a metallized polyester film.
- 1 7. The composite liner panel of claim 1, further comprising a first adhesive layer
2 intermediate said barrier layer and said at least one structural polymer resin layer and
3 attaching said barrier layer and said at least one structural polymer resin layer.
- 1 8. The composite liner panel of claim 1, wherein said at least one gas impermeable barrier
2 layer is a metallized polypropylene film.
- 1 9. The composite liner panel of claim 1, wherein said at least one gas impermeable barrier
2 layer is a metal foil.
- 1 10. The composite liner panel of claim 9, further comprising an adhesive layer coplanar
2 with and intermediate said at least one foil layer and said at least one structural polymer
3 resin layer and attaching said at least one foil layer and said at least one structural
4 polymer resin layer.
- 1 11. The composite liner panel of claim 1, further comprising a scrim layer intermediate
2 said at least one barrier layer and said insulated core layer.

- 1 12. The composite liner panel of claim 1, further comprising a surface film layer.
- 1 13. The composite liner panel of claim 12, wherein said surface film layer is a polymer.
- 1 14. The thermal insulated composite wall panel of claim 13, wherein said surface film layer
2 polymer is polypropylene.
- 1 15. The composite liner panel of claim 11, wherein said scrim layer is formed from fibers.
- 1 16. The composite liner panel of claim 15, wherein said fibers are glass.
- 1 17. The composite liner panel of claim 11, wherein said fibers are polyester.
- 1 18. The composite liner panel of claim 7, further comprising a second structural polymer
2 resin layer coplanar with said at least one gas impermeable barrier layer located on the
3 opposite side of said first structural polymer resin layer.
- 1 19. The composite liner panel of claim 18, wherein said second polymer resin is
2 polypropylene.
- 1 20. The composite liner panel of claim 18, further comprising a second adhesive layer
2 coplanar with and intermediate said at least one gas impermeable barrier layer and said
3 second structural polymer resin layer and attaching said barrier layer and said second
4 structural polymer resin layer.
- 1 21. The composite liner panel of claim 1, wherein said polymer resin is a thermoset
2 material.
- 1 22. The composite liner panel of claim 21, wherein said barrier layer is sprayed onto said
2 thermoset material.
- 1 23. The composite liner panel of claim 21, wherein said barrier layer is sputtered onto said
2 thermoset material.
- 1 24. The composite liner panel of claim 21, wherein said barrier layer is adhesively bonded
2 to said thermoset material.
- 1 25. The composite liner panel of claim 1, wherein said insulated core layer is gas
2 impregnated rigid foam.
- 1 26. The composite liner panel of claim 7, wherein said adhesive layer further comprises a
2 film.
- 1 27. The composite liner panel of claim 20, wherein said second adhesive layer further
2 comprises a film.

- 1 28. A composite liner panel for use in a thermal insulated wall structure, comprising:
- 2 a. an insulating core layer;
- 3 b. at least one gas impermeable barrier layer that is coplanar with and
- 4 attached to said insulating core layer; and
- 5 c. at least one structural polymer resin layer disposed coplanar to and
- 6 consolidated with said barrier layer, thereby forming a laminate liner panel.
- 1 29. The cargo compartment of claim 28, wherein said at least one structural polymer resin
- 2 layer is fiber reinforced.
- 1 30. The composite liner panel of claim 28, wherein said structural polymer resin is
- 2 polypropylene.
- 1 31. The composite liner panel of claim 30, wherein said at least one gas impermeable
- 2 barrier layer is a metallized polyester film.
- 1 32. The composite liner panel of claim 28, further comprising a first adhesive layer
- 2 coplanar with and intermediate said at least one barrier layer and said at least one
- 3 structural polymer resin layer attaching said barrier layer to said at least one structural
- 4 polymer resin layer.
- 1 33. The composite liner panel of claim 28, wherein said at least one gas impermeable
- 2 barrier layer is a metallized polypropylene film.
- 1 34. The composite liner panel of claim 28, wherein said at least one gas impermeable
- 2 barrier layer is a metal foil.
- 1 35. The composite liner panel of claim 33, further comprising an adhesive layer coplanar
- 2 with and intermediate said at least one foil layer and said at least one structural polymer
- 3 resin layer attaching said at least one foil layer to said at least one structural polymer
- 4 resin layer.
- 1 36. The composite liner panel of claim 28, further comprising a polymer scrim layer
- 2 intermediate said insulating core and said at least one barrier layer.
- 1 37. The composite liner panel of claim 28, further comprising a surface film layer disposed
- 2 coplanar to and bonded with said at least one structural polymer layer.
- 1 38. The composite liner panel of claim 37, wherein said surface film layer comprises
- 2 polypropylene.

- 1 39. The composite liner panel of claim 32, further comprising a second structural polymer
2 resin layer coplanar with said at least one gas impermeable barrier layer and located on
3 the opposite side of said first structural polymer resin layer.
- 1 40. The composite liner panel of claim 39, wherein said second structural polymer is
2 polypropylene.
- 1 41. The composite liner panel of claim 39, further comprising a second adhesive layer
2 coplanar with and intermediate said at least one barrier layer and said second structural
3 polymer resin layer attaching said barrier layer to said at least one structural polymer
4 resin layer.
- 1 42. The composite liner panel of claim 36, said scrim layer further comprising fibers.
- 1 43. The composite liner panel of claim 42, wherein said fibers are polyester.
- 1 44. A method for forming a composite liner panel for use in a thermal insulated wall
2 structure, comprising:
3 a. providing
4 at least one gas impermeable barrier layer,
5 at least one structural polymer resin layer disposed coplanar to said
6 barrier layer, and
7 a thermal insulated core layer
8 b. bonding said at least one gas impermeable barrier layer to said at least
9 one structural polymer layer, thereby forming a laminate liner panel;
10 c. attaching said laminate liner panel to said thermal insulated core layer.
- 1 45. The method for forming a composite liner panel of claim 44, step (b) further
2 comprising heating said at least one gas impermeable barrier layer and said at least one
3 structural polymer resin layer and compressing together said at least one gas
4 impermeable barrier layer and said at least one structural polymer resin layer.
- 1 46. The method for forming a composite liner panel of claim 45, further comprising
2 cooling said laminate after step (b).
- 1 47. The method for forming a composite liner panel of claim 44, wherein said structural
2 polymer is a thermoset material.

- 1 48. The method for forming a composite liner panel of claim 47, step (b) further
2 comprising providing an adhesive intermediate said barrier layer and said at least one
3 structural polymer resin layer attaching said barrier layer to said at least one structural
4 polymer resin layer.
- 1 49. The method for forming a composite liner panel of claim 47, step (b) further
2 comprising spraying said barrier layer onto said at least one structural polymer resin
3 layer.
- 1 50. The method for forming a composite liner panel of claim 45, wherein said at least one
2 gas impermeable barrier layer is a metallized polyester film.
- 1 51. The method for forming a composite liner panel of claim 50, further comprising
2 providing a first adhesive layer intermediate said at least one metallized polyester film
3 and said at least one structural polymer resin layer attaching said at least one metallized
4 polyester film to said at least one structural polymer resin layer.
- 1 52. The method for forming a composite liner panel of claim 51, wherein said at least one
2 gas impermeable barrier layer is a metallized polypropylene film.
- 1 53. The method for forming a composite liner panel of claim 44, wherein said at least one
2 gas impermeable barrier layer is a metal foil.
- 1 54. The method for forming a composite liner panel of claim 51, further comprising
2 providing a second structural polymer resin layer coplanar to said at least one gas
3 impermeable barrier layer and on the opposite side of said at least one structural
4 polymer resin layer.
- 1 55. The method for forming a composite liner panel of claim 54, further comprising
2 providing a second adhesive layer intermediate said at least one metallized polyester
3 film and said second structural polymer resin layer.
- 1 56. The method for forming a composite liner panel of claim 44, wherein said structural
2 polymer resin layer is fiber reinforced.
- 1 57. The method for forming a composite liner panel of claim 56, wherein said fibers are
2 glass.

- 1 58. The method for forming a composite liner panel of claim 55, further comprising
2 providing a scrim layer coplanar with and intermediate said second structural polymer
3 resin layer and said insulated core layer.
- 1 59. The method for forming a composite liner panel of claim 44, wherein said insulated
2 core layer comprises gas impregnated foam core.
- 1 60. The method for forming a composite liner panel of claim 59, wherein said insulated
2 core layer further comprises polyurethane.